BIS OXFORD ECONOMICS

INPUT COST ESCALATION FORECASTS TO 2027/28

PREPARED BY BIS OXFORD ECONOMICS FOR ICON WATER

UPDATE - FINAL

DECEMBER 2022

BIS Oxford Economics

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December 2022

The modelling and results presented here are based on information provided by third parties, upon which BIS Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

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1. EXECUTIVE SUMMARY

BIS Oxford Economics (BISOE) was engaged by Icon Water to provide forecasts and a report on expected wage changes, future electricity prices and forecasts of construction and chemical costs relevant to the water and wastewater business in the Australian Capital Territory for the period to 2027/28. These forecasts will be used by Icon Water to develop their operating and capital expenditure forecasts which, in turn, will be included in Icon Water's response to the Independent Competition and Regulatory Commission (ICRC) Draft Decision, covering the five-year period from 2023/24 to 2027/28 inclusive.

This brief report and the accompanying forecasts are updates to the full report and forecasts prepared in late February/early March and delivered to Icon Water on 3rd March 2022. These latest forecasts for wages, chemicals and construction costs use the same methodology as those provided in March, while the methodology for forecasting electricity prices has been amended, in response to comments and suggestions from the ICRC and their consultants, Marsden Jacobs Associates (MJA).

The input escalation forecasts incorporate the latest data and macro-economic forecasts as at mid-November 2022, including the September quarter 2022 releases of the Consumer Price Index (CPI), Wage Price Index (WPI) and Producer Price Index (PPI), plus the Reserve Bank of Australia (RBA) forecasts for the CPI and WPI contained in the RBA November 'Statement of Monetary Policy'. Note that most of the references to historical data and forecasts of wages are in nominal terms unless specifically stated that the data/forecasts are in real (inflation-adjusted) terms.

1.1 WAGES & INFLATION OUTLOOK

BIS Oxford Economics expects **real** wage costs for the Australian Electricity, Gas, Water and Waste Services (EGWWS or 'Utilities') sector — as measured in the Wage Price Index (WPI) — will grow (escalate) by an average of 0.66% per annum over the five years to 2027/28, 0.3% higher than the national 'All Industries' average over the same five-year period. Over the same five-year period to 2027/28, the **ACT EGWWS WPI** is forecast to average 0.52% p.a., which will be 0.11% higher than the ACT all industries WPI average of 0.41% p.a. (all in real terms).

In terms of **overall wage costs**, the **full 0.5% for the Superannuation Guarantee (SG) increases** each year should be **added to the forecast WPI increases** in each of the years from 2022/23 to 2025/26 inclusive, to arrive at the total percentage increase in labour costs. The Superannuation Guarantee Charge (SGC) is not included in the regular wage measure preferred by the Australian Energy Regulator or the ICRC – the Wage Price Index (WPI). The SGC is in effect a labour 'on-cost'. In terms of escalating wage costs over the regulatory period, the SGC therefore needs to be added to the forecast increases in the WPI.

National and ACT utilities wages are forecast to increase by more than the national and state/territory All Industries averages over the forecast period because of the following factors:

- the electricity, gas and water sector is a capital intensive industry whose employees have higher skill, productivity and commensurately higher wage levels than most other sectors.
- the strong union presence in the utilities sector will ensure outcomes for collective agreements (which cover 65% of the EGWWS workforce) remain above the wage increases for the national All Industries average. In addition, as EBAs wage rises are normally higher than individual agreements and, as there is a higher proportion of employees on EBAs in the EGWWS sector compared to the national average (38%), this means higher overall wage rises in the EGWWS sector.

- increases in individual agreements (or non-EBA wages) are expected to strengthen from the recent subdued pace as the labour market tightens, especially from 2022/23 with the unemployment rate now around 3.5% and expected to remain below 4% over the next three years.
- demand for skilled labour will pick up and strengthen with the high levels of utilities investment from 2021/22to 2027/28, with overall utilities investment levels expected to remain elevated over the next 6 years. BIS Oxford Economics is forecasting electricity-related engineering construction to be 45% higher in 2027/28 compared to 2020/21 levels. This will also be a key driver of wages going forward.
- the overall national average tends to be dragged down by the lower wage and lower skilled sectors such as the Retail Trade, Wholesale Trade, Accommodation, Cafés and Restaurants, and, in some periods, also Manufacturing and Construction. These sectors tend to be highly cyclical, with weaker employment suffered during downturns impacting on wages growth, such as what occurred in the wake of the COVID-19 impacts. The EGWWS sector is not impacted in the same way due to its obligation to provide essential services and thus retain skilled labour.

During the COVID-19 crisis, the EGWWS sector fared much better than just about all other sectors, along with the Education, Health & Social Assistance and Finance and Insurance sectors, in terms of wage increases over 2019/20 and 2020/21. However, relatively low quarterly increases of 0.1% in each of the March and June quarters 2021 resulted in annual growth in the EGWWS WPI in 2021/22 slip below the All Industries average for only the second time in the past two decades. Overall, EGWWS WPI growth was 1.5% in 2021/22, around 0.6% lower than the All Industries average. BISOE believes this will be a short-lived aberration and that the EGWWS WPI will rebound strongly over the next year to again outpace the national average. Driving this will be much higher EBAs negotiated in an environment of very high inflation and a very tight labour market, particularly for the types of skilled labour that dominate in the sector.

EBA outcomes were weaker over 2020/21 and remained subdued in 2021/22, compared to the five years to 2019/20, when EBAs averaged around 2.9%. EBAs in the EGWWS industry have been dragged down by an extremely low agreement in Western Australia in the June 2021 quarter and a relatively low agreement in NSW in the September 2021 quarter, which will have a short-term impact as both sets of agreements run for less than two years. We expect the next rounds of EBAs negotiated in the sector to rise strongly over the next 2-3 years due to a number of factors, including:

- CPI inflation will remain high (as the RBA expect it will average well above 6% in 2022/23 and above 4% in 2023/24),
- the demand for skilled labour remains strong, and
- the recent high enterprise agreement outcomes in the construction sector will influence negotiations in the EGWWS sector, as some skills can be transferable.

A key element adding to wage pressures in 2021/22 and over 2022/23 is the rapid tightening in the national labour market that is now apparent. Employment as of October 2022 was well above pre-COVID levels, with the unemployment rate at 3.4% and labour force participation rates at record levels. A key to the outcomes has been little growth in the pool of available labour. The cessation of international migration to Australia since March 2020 has seen population growth plummet to just 0.2% in the year to June 2021, while the working age population (above 15 years old) increased by only 50,000 (+0.2%) over 2020/21 and 206,000 in 2021/22, compared to over 330,000 persons in 2018/19 and in the year to March 2020. Growth in the labour force has been facilitated by a marked increase in the labour force participation rate to record levels. However, there is now little scope to raise the participation rate further and, with the underemployment rate pushing lower and job vacancies well above pre-COVID levels, wage pressures are building.

Fig. 1.1 Australia: Employment and Unemployment

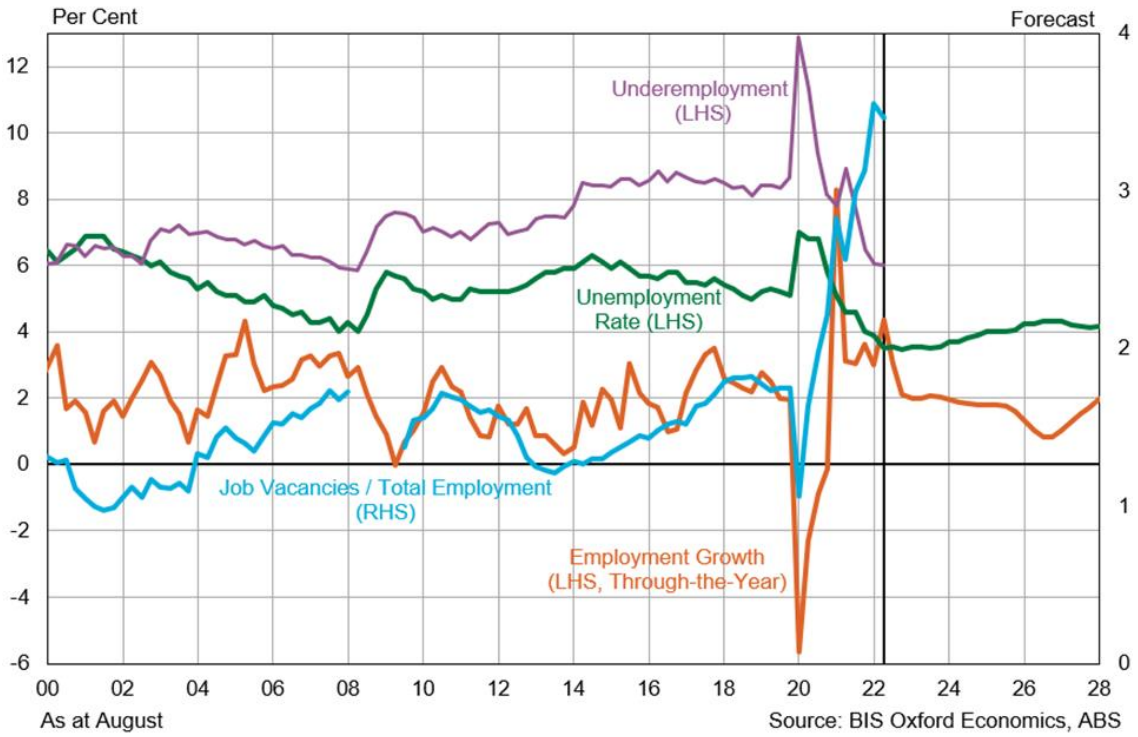
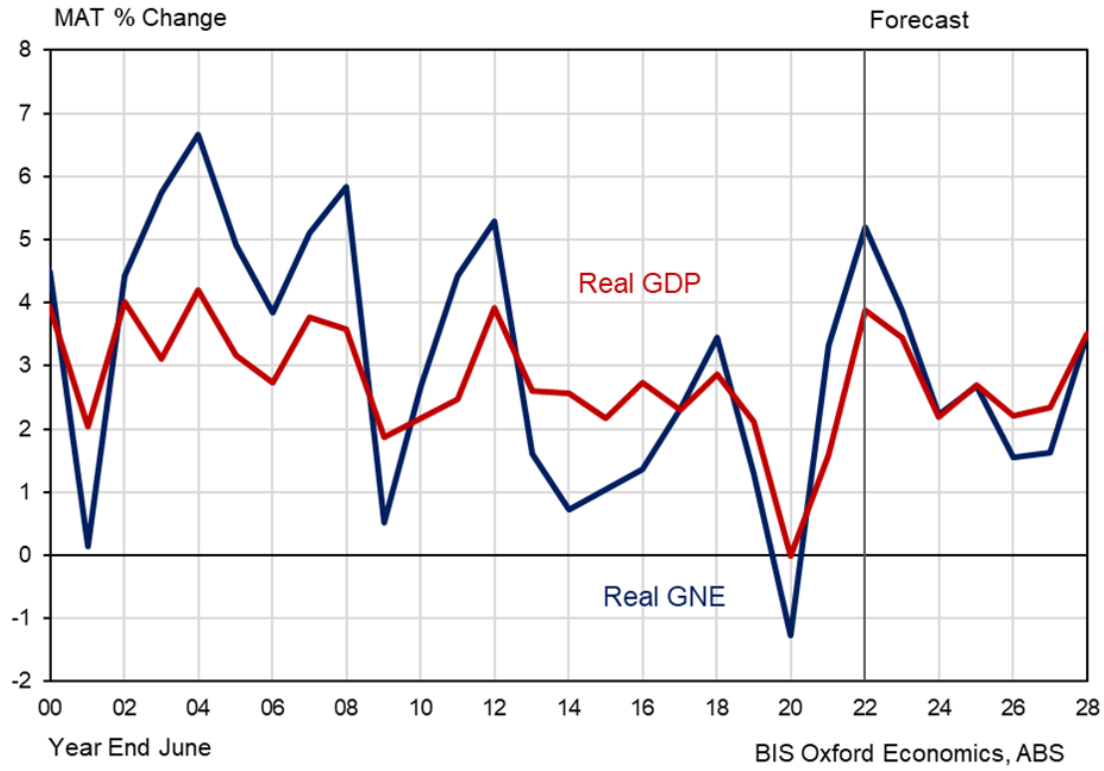


Figure 1.2 Australia Key Indicators



As the economy continues to remain resilient over 2022/23 to 2024/25 (albeit with weaker GDP growth than previously forecast in March), we expect to see sustained tightness in the labour market, with labour demand increasing and the unemployment rate remaining around 3.5% to 4% over 2022/23 to 2024/25. Although BISOE's economic growth (GDP) forecasts are modestly weaker for 2022/23 and 2023/24, we still expect the labour market to remain tight. Skill shortages, which have already emerged, are expected to broaden and worsen in many areas of the economy. The tightening labour market will see wage pressures increase. The Australian **All Industries WPI** is forecast to pick up to 3.2% in 2022/23 (from 1.5% in 2021/22) and then strengthen further as the labour market tightens and in response to high CPI inflation. Wages will be slower to pick up compared to the inflation rate, due to lags in the transmission of wage increases, particularly in the enterprise bargaining segment, where the duration of agreements runs for 2-3 years. But as agreements are re-negotiated in an environment of a very tight labour market (with the unemployment rate expected to be below 4%) and high consumer inflation, there will be a commensurate lift in wage increases. The Australian All industries WPI is forecast to increase to 3.9% in 2023/24 and average around 4% in 2024/25 and 2025/26, before easing over the subsequent two years as the economy cools, the unemployment rate rises back above 4% and CPI inflation eases.

A **key difference between the latest wage forecasts and those provided in March** 2022 is the significant lift in CPI inflation forecasts. In February 2022 Statement of Monetary Policy (SoMP), the RBA forecast that CPI would rise and peak at 3¾% in the June quarter 2022, and then subsequently ease to 2¾% by June 2023 and stay there until June 2024. The RBA's November 2022 SoMP forecasts the headline CPI rate to be 8% in the December 2022 quarter, easing to 6 ¼% in the June quarter 2023 (giving a year average of 7.1% for 2022/23). An easing to 4¾% is forecast for the December quarter 2023 and then to 4.2% in the June quarter 2024 – giving a year average CPI rate of 4.8% for 2023/24. The RBA's CPI forecast for December 2024 is 3.2%, after which we have the annual rate easing to its long-run rate of 2.5% by June 2024 - giving a year average CPI rate of 3.0% for 2023/24. Beyond the RBA's forecast from the SoMP, we assume the CPI averages 2.5% over the medium-to-long term.

As discussed in the previous March report – and in the subsequent 'Request for Information' in August - the key determinants of nominal wage growth are consumer price inflation, productivity, economic growth (i.e., output or GDP) and the relative tightness of the labour market (i.e. the demand for labour compared to the supply of labour), as measured by the unemployment rate and the under-employment rate. It is important to note that wage growth usually lags changes in the labour market, inflation and economic conditions, because of the inherent lags in wage setting mechanisms.

In the short-term, we analyse the expected future wage movements in the three main methods of setting pay. In terms of those workers on awards who have their pay determined by the Fair Work Commission (FWC) in the annual National Minimum Wage (NMW) case, the increase given in June for the 2022/23 financial year was much higher than we anticipated in February – with the FWC awarding a 5.2% increase to workers on the minimum wage, although workers on award rates will only receive a 4.6% increase (minimum $40/week increase for award rates below $870/week).

A key element of this decision was the very high CPI inflation rate of 5.1% in the March quarter 2022 (which was latest available quarter). Given that CPI inflation has moved higher, it is likely that the minimum and award increases provided by the FWC will remain high for the next 1-3 years, particularly given the support for higher wages from the new Federal Labor Government (which the previous government did not support). These FWC decisions will also influence the strength of wage increases given to those who receive their wages via 'individual arrangements' pay setting arrangements. As discussed above, employees on the third form of wage-setting – collective agreements or enterprise bargaining (EBAs) – will also pursue higher wage outcomes due to higher inflation, as their current agreements expire. Although wage increases related to the NMW and relevant awards are set each July, many enterprise agreements – covering 38% of the full-time

workforce – run for an average of 2-3 years. These agreements averaged 2.6% over the four years to June 2021, having been set in an environment of low inflation and a much less tight labour market. However, as these previous (low wage increases) agreements expire, we expect the next round of agreements to be materially higher, due to both high CPI inflation and because of widespread skilled labour shortages. The bottom line is that the next round of wage rises negotiated by workers will be much higher than in recent years.

Returning to the outlook for EGWWS wages, we expect to see the continuation of critical skilled labour shortages and competition for scarce labour, which are now emerging - particularly from the mining and construction sectors, which will push up wage demands in the utilities sector. Mining investment is now picking up and we expect to see significant increases over the next 2 years to 2023/24 and remain at elevated levels until the end of the decade. Meanwhile, there is similar strong growth coming through in the Construction sector, with solid increases across all segments of the overall construction sector (residential building, non-residential building and civil engineering & infrastructure construction) over 2021/22 to 2024/25, leading to strong labour demand in that sector, particularly from 2024 when activity surpasses the 2018 levels. With regard to utilities investment, BIS Oxford Economics forecasts steady increases over the next seven years, with electricity-related engineering construction projected to be 45% higher in real terms in 2078/28 compared to 2020/21 levels, including a 14% increase over 2023/24 to 2027/28.

Employers are already reporting an increasing shortage of technicians and trade workers, and employees with STEM skills. These are essential workers in the utilities sector. A key problem is that the TAFE (technical and further education) systems across the country have simply not been training enough workers. BIS Oxford Economics research shows this is being compounded by new graduates in the trades stream, in particular, not increasing fast enough to replace retiring workers, with new graduate numbers in some trades actually falling. Despite government announcements that they are moving to address the TAFE system, it is unlikely that these issues will be fully addressed within the next five years. Added to this is that skilled immigration is recently returning after being suspended since early 2020. Although now resumed, it is likely to be a slow ramp-up, meaning that the skill shortages will persist and will not be easily or quickly solved by migration.

With strong competition for similarly skilled labour from the mining and construction industries, firms in the utilities sector will need to raise wages to attract and retain workers. In other words, the mobility of workers between the EGWWS, mining and construction industries means that demand for workers in those industries will influence employment, the unemployment rate and spare capacity in the EGWWS labour market. Businesses will find they must ‘meet the market’ on remuneration to attract and retain staff. Accordingly, we expect wages under both individual arrangements and collective agreements to increase markedly over the 2022/23 to 2025/26 period.

Wages in the ACT utilities sector are forecast to lift in 2022/23 to 3.1% (from an estimated 1.5% in 2021/22), as a new round of EBAs are negotiated and non-EBA wages pick up due to higher inflation and the tightening labour market in the ACT and NSW. Thereafter, wages in the ACT utilities sector are expected to move in line with – but remain slightly lower than - the national utilities sector average through most of the forecast and regulatory period (see table 1.1). This is due to relatively weaker growth in utilities construction and overall construction in the ACT, compared to other states.

Nevertheless, there is expected to be strong and sustained growth in utilities-related construction over the forecast period, which will drive strong wage pressures in the utilities sector in the Territory. Meanwhile, total construction activity in the ACT is forecast to lift 20% over the next two years, before dropping back over 2024/25 to 2026/27 and again rising strongly to the end of the decade. In addition, there will be strong wage pressures emanating from NSW, also due to high and increasing levels of utilities and overall construction activity.

ACT EGWWS WPI growth is forecast to average 3.6% per annum in nominal terms over the five years to 2027/28 inclusive (i.e., over Icon Water's next regulatory period) – or 0.5% in real (inflation-adjusted) terms (see Table 1.1). Compared to the EGWWS WPI forecast in March 2022, the nominal wage growth is higher (it was 3.2%), but the real increase is lower – it was 0.7% in March – because the CPI inflation forecast is materially higher, now forecast to average 3.1% compared to 2.6% in the March forecasts.

The 'All Industries' WPI for ACT is used to escalate Icon Water's **general labour** (i.e., non-network and non-external professional labour) costs. Growth in total or 'All Industries' wages at the state level usually depends on the relative strength of the state economy and labour markets, compared to the national average. Over the 2022/23 to 2027/28 period, we expect the ACT all industries WPI to continue track the movements in the Australian average, but with the ACT average slightly below the national average. The lower wage growth in the ACT vis-à-vis the national average is in line with the growth differentials between the ACT and Australian economy, although lower wage growth in the ACT public sector will continue to keep overall wages growth relatively muted over 2022/23 to 2025/26, compared to the national All Industries average. Conversely in 2026/27 and 2027/28, we expect slightly higher growth than the national average, due to stronger economic growth in the ACT over 2025/26 and 2026/27. In the five years to 2027/28, we are forecasting the total territory (All Industries) WPI in the ACT to average 3.5% in nominal terms, close to the national average. In real (inflation-adjusted) terms, the average annual increase is forecast to be 0.4% (see Table 1.1).

Table 1.1 Summary – Labour & Materials Cost Escalation Forecasts: ACT
(per cent change, year average, year ended June)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Average (h)
NOMINAL CHANGES			Actuals				Forecasts	Next Revenue Determination Period					
Australian Capital Territory Wages: All Industries Wage Price Index (a)	1.8	2.0	2.1	2.3	1.4	2.5	3.1	3.6	3.7	3.5	3.3	3.2	3.5
Electricity, Gas, Water and Waste Services Wages: Australian Capital Territory - Wage Price Index (b)	2.3	2.2	2.8	2.7	1.9	1.5	3.1	3.7	3.9	3.7	3.4	3.2	3.6
Electricity Price: ACT - Large Industrial Users (c)	17.0	28.4	7.8	-12.8	-0.8	9.2	-1.1	35.4	56.4	-25.0	-12.7	1.1	11.0
Chemical Prices (d)	-1.7	7.9	15.2	-3.7	-0.1	7.9	27.6	-5.7	-3.0	-1.8	2.6	2.4	-1.1
Construction Costs (e)	0.1	1.3	3.1	2.7	2.2	5.2	5.4	2.9	3.4	3.0	3.0	2.9	3.0
Consumer Price Index (headline) (f)	1.7	1.9	1.6	1.3	1.6	4.4	7.1	4.8	3.0	2.5	2.5	2.5	3.1
REAL CHANGES (g)													
Australian Capital Territory Wages: All Industries Wage Price Index (a)	0.1	0.0	0.4	0.9	-0.2	-2.0	-4.0	-1.1	0.7	1.0	0.8	0.7	0.4
Electricity, Gas, Water and Waste Services Wages: Australian Capital Territory - Wage Price Index (b)	0.6	0.2	1.2	1.3	0.2	-3.0	-4.0	-1.1	0.9	1.2	0.9	0.7	0.5
Electricity Price: ACT - Large Industrial Users (c)	15.3	26.5	6.2	-14.2	-2.4	4.7	-8.2	30.6	53.3	-27.5	-15.2	-1.4	8.0
Chemical Prices (d)	-3.4	5.9	13.5	-5.1	-1.7	3.4	20.5	-10.4	-6.0	-4.3	0.1	-0.1	-4.1
Construction Costs (e)	-1.7	-0.6	1.5	1.4	0.5	0.8	-1.7	-1.9	0.3	0.5	0.5	0.4	0.0

Source: ABS, RBA, Icon Water, BIS Oxford Economics

(a) Wage price index. Ordinary time hourly rates of pay excluding bonuses.
(b) EGWWS WPI historical data is estimated for Australian capital territory
(c) Icon Water's Electricty price proxied by price for large industrial users in ACT
(d) Icon Water's chemical prices proxied by Australian Basic Chemical Manufacturing Producer Price Index (PPI)
(e) Construction costs proxied by Water & Sewerage Construction Implicit Price Deflator for Australia
(f) Inflation forecasts are RBA forecasts to December 2024 from latest 'Statement of Monetary Policy'. Beyond that, inflation forecasts are based on the mid-point of RBA inflation target (2.5%).
(g) Real price changes are calculated by deducting the inflation rate from nominal price changes.
(h) Average for the next revenue determination period i.e. from 2023/24 to 2027/28 inclusive.

1.2 CONSTRUCTION COSTS

The water supply and sewerage construction IPD (implicit price deflator) tracks movements in water supply and sewerage construction costs. The water supply and sewerage IPD is an input-based index, and so does not include contractor margins. For this project, we performed additional research into the construction of the IPD to find the inputs which provide the best fit to historical cost movements in the index. The input weightings used to forecast the IPD were set out in the previous report.

Construction costs – as proxied by the Water & Sewerage Construction implicit price deflator (IPD) – are forecast to show no real increase (0% in real terms) over the five years from 2023/24 to 2027/28. This compares to the average 0.34% real increase predicted in the March report. In nominal terms, the construction IPD is forecast to increase by an average of 3.03% p.a. which, while slightly higher than the 2.9% forecast in March 2022, is effectively eroded by the higher CPI inflation projection. However, it is important to note that the 2022/23 base of construction costs is expected to be much higher than the March prediction, with the actual outcome in 2021/22 almost 1% higher than the March estimate and the forecasts 3.5% higher – in March we forecast 1.9% growth in construction costs in 2022/23, but now we expect a nominal increase of 5.4%. The latest June 2022 quarter data showed that the Water & Sewerage Construction IPD was 5.7% higher than the June quarter 2021, which will underpin a high increase in 2022/23. The bottom line is that construction costs will be at much higher levels than in the five years to 2020/21.

The key driver of increased costs over the forecast period will be strong growth in construction wages (which comprise 60% of the overall index), due to skilled labour shortages and rising construction activity, with total construction activity set to surpass the previous peak by 2023/24 and remain at elevated level to 2025/26. These higher activity levels will also see other related construction inputs, such as plant and equipment hire, concrete, etc, all rise sharply over 2022/23 and remain at elevated levels in the period to 2025/26, before easing as construction activity falls back. The Construction WPI has recorded much faster growth than the All Industries WPI over the past year and is forecast to outstrip the All Industries WPI over the next few years.

However, expected declines in some commodity prices over the next 2-3 years will feed through to some of the inputs into the Water & Sewerage construction IPD, including steel and oil prices, the latter pushing down prices for plastic piping and freight costs. Weaker growth in these prices or price declines (from current high levels) will tend to mute the price growth in the overall IPD over 2023/24 and 2024/25.

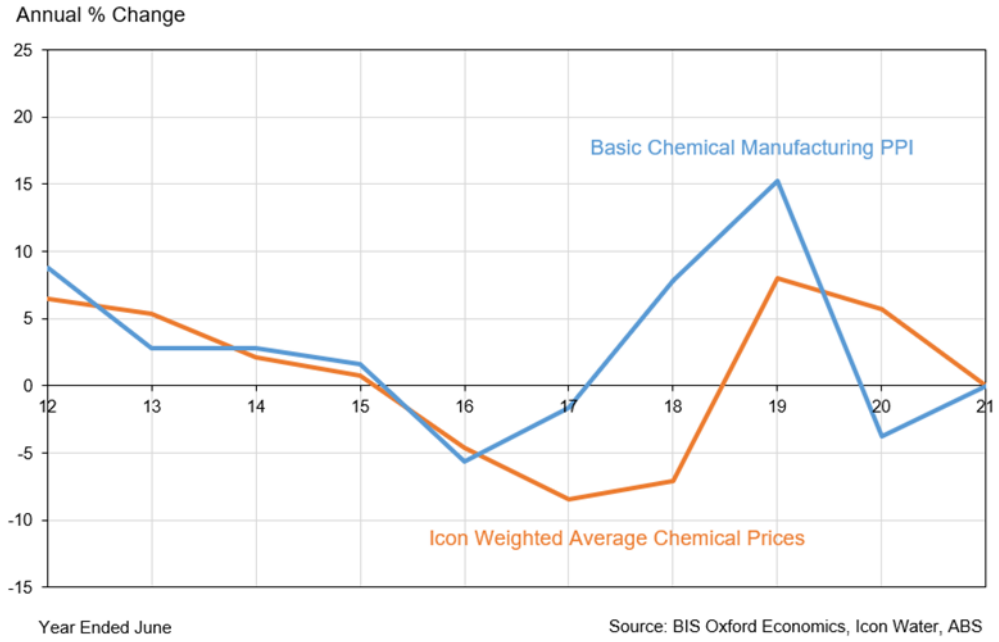
1.3 CHEMICALS PRICES

We have used the producer price index (PPI) for Basic Chemical Manufacturing to proxy Icon Water's chemical price changes. The main drivers of prices include: the price of oil, which we understand is used in the manufacturing process for numerous chemicals purchased by Icon Water (noting that this also would capture the use of natural gas used to manufacture chemicals given that the price of oil and gas are related); a manufacturing input price index from the ABS called 'Non-Metallic Mineral Quarrying' – which covers the quarrying of materials such as alum and salt; plus manufacturing wages, the exchange rate, and electricity and gas prices.

We chose to represent price movements with the index for a number of reasons – firstly, the index allows for a more detailed view of historical prices than the series provided by Icon Water. Furthermore, for any pricing submissions to regulatory agencies, there is often a focus on official price series such as the ABS producer price indices (or wage price indices, or consumer price index). Finally, we find a strong correlation between the ABS index and the weighted average of the prices

provided by Icon Water. This is illustrated in Figure 1.3, with a comparison between FY12-21 (the most recent date that is available from the Icon Water data).

Fig. 1.3 Weighted Average of Icon Water Chemical Prices and ABS Producer Price Index



The strong price increase in 2021/22 (+7.9% in nominal terms) in the Basic Chemical Manufacturing PPI is expected to be followed by a substantial 27.6% lift in 2022/23. The latest September 2022 quarter data showed that the PPI was up 29.5% through-the-year compared to the September 2021 index level, with this high current level expected to underpin the very large increase in 2022/23. These very strong price increases are being driven mainly by the jump in oil prices, further reinforced by the lower exchange rate, which are also driving up quarrying costs via the higher price of diesel. Going forward, prices are expected to fall back from current peaks over 2023/24 to 2025/26, as firstly oil prices decline, and then gas and electricity prices ease back. Prices are then expected to rise over 2026/27 and 2027/28 as wages and other input prices rise, including oil prices, with an expected fall in the exchange rate in 2026/27 (mainly due to a cut in interest rates) putting upward pressure on A$ oil prices.

Over the next regulatory period of 2023/24 to 2027/28, nominal prices are forecast to decline by an average of -1.1% p.a. In real terms, real prices are forecast to decline by an average of -4.1% p.a., with the higher CPI inflation outlook driving prices down from the historic highs of 2022/23.

Quoted market prices Icon Water provided for the 2022/23 financial year, showed substantial increases and are in line with the very large increases in the Basic Chemicals Manufacturing PPI over the past 18 months. Given the lags in the PPI and the average chemical prices paid by Icon Water – see figure 1.3 above - it is likely that the high prices of 2022/23 will see further price rises in 2023/24, particularly as Icon Water may need to enter into longer contracts to ensure security of supply. This is in line with the recent changes to the *Security of Critical Infrastructure Act (2018)*, which received royal assent in December 2021, and some further expected changes under the *Security Legislation Amendment to Critical Infrastructure bill (2022)*.

2. ELECTRICITY COSTS FORECASTS

This section of the report provides the latest electricity forecast outlook for Icon Water, to be used in their operating and capital expenditure forecasts. This is an update to the forecasts prepared for Icon Water in March 2022.

The key changes to the forecasts in this report include an update for the more recent historical data and reflect the latest economic outlook. The methodology for the wholesale component of the retail forecasts has also been revised, following feedback from the ICRC and their consultants, Marsden Jacob Associates (MJA). The network charge forecasts also incorporate the latest EN24 Draft Proposal by Evoenergy to the Australian Energy Regulator (AER) for the 2024/25-2027/28 regulatory period.

Wholesale electricity price forecasts (nominal)

Energy Fuel Costs

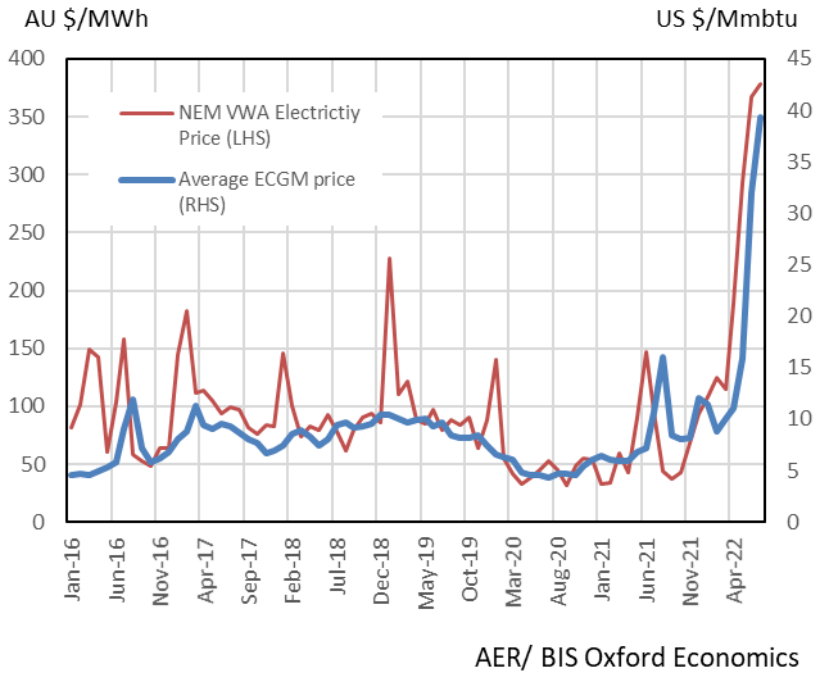
The economic environment has changed significantly since March 2022. While the world emerged from lockdowns at the start of this year, ongoing supply chain bottlenecks meant supply was unable to catch up with the strong recovery in demand for goods. This put upward pressure on global commodity prices, particularly energy. Since then, the worsening Russia-Ukraine conflict and subsequent curtailment of gas supply to Europe has added further upward pressure to gas prices in Europe.

Eventually this has spread to other markets across the world, including the Japanese-Korea Marker (JKM) – the reference price for Australia's LNG exports. As a result, the upward price pressure has permeated domestic gas prices in Australia as well. The gas netback price (ex-Wallumbilla) is estimated to have been $66/GJ in October 2022 compared to $30/GJ in March 2022[1], significantly higher than the average gas price of $7.5/GJ between 2018-19 to 2020-21.

The rise in gas prices has also translated to strong wholesale electricity spot market, as gas powered generators (GPG) more frequently set the market price, illustrated in the figure below. Thermal coal prices in the export market have also seen a similarly strong price rise this year, owing to supply chain bottlenecks. This has also contributed to the recent strong electricity wholesale price rises.

[1] Historical and futures ex-Wallumbilla gas prices are available on the ACCC website. For more details, please see https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-25/lng-netback-price-series.

Fig. 2.1 Australia: NEM Volume Weighted Average (VWA) Wholesale Electricity Price vs. Average East Coast Gas Market Price (ECGM)[2] - History



Going forward, gas and thermal coal near-term forecasts are sourced from the *Consensus Economics* monthly publication *Energy & Metals Consensus Forecasts (E&MCF).* For Thermal Coal, the longer-term forecasts are supplemented by forecasts from the official Commonwealth Government commodity forecaster, the Department of Industry, Science and Resources' Office of the Chief Economist publication *Resource and Energy Quarterly* (REQ)[3]. The gas forecasts in the longer-term are anchored to *Consensus E&MCF* Brent Oil forecasts and are assumed to return to the historical relationship between gas and oil by the end of the forecast period.

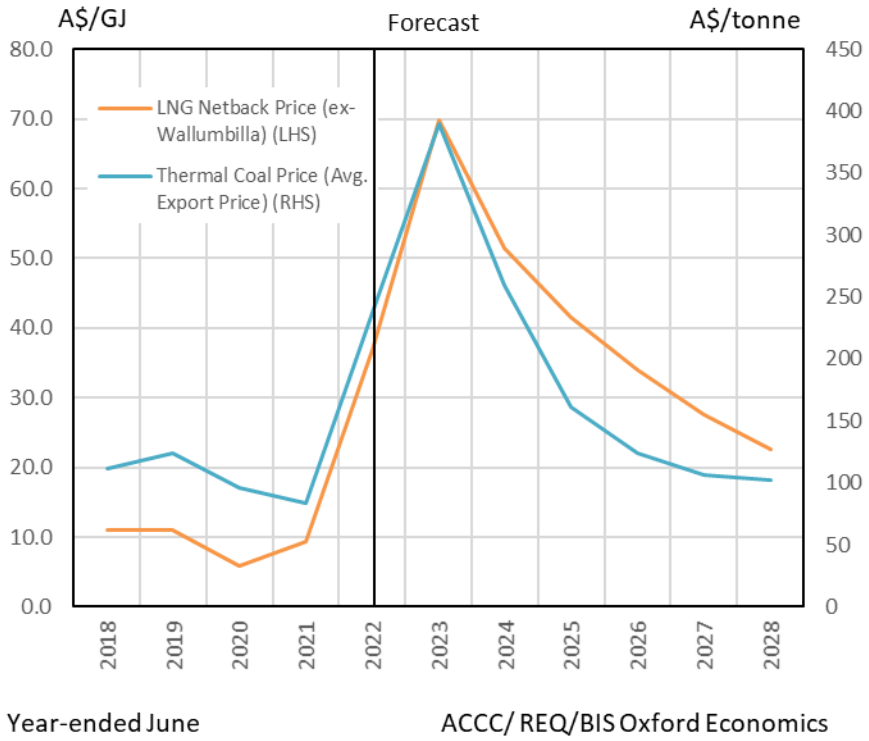
For both fuel sources, prices are expected to peak in 2023-24 ($389/tonne for coal and $70/GJ for gas). From 2023-24, it is expected that prices will take some time to correct. Thermal coal price only returns to historical levels by the end of the forecast window while gas prices still remain elevated (at $22/GJ) compared to history, by 2028-29.

It is worth noting that considerable **uncertainty** surrounds the pace of normalisation in these prices. With the ongoing conflict in Ukraine and Europe now heading into winter, the risk remains significantly weighted to the upside for prices.

[2] The ECGM is derived by the AER and references the Short Term Trading Market (STTM), Gas Supply Hub (GSH) and Declared Wholesale Gas Market (DWGM) in Victoria. For more information please see AER's *Wholesale Markets Quarterly Report – Q2 2022* https://www.aer.gov.au/wholesale-markets/performance-reporting/wholesale-markets-quarterly-q2-2022#:~:text=This%20Wholesale%20Markets%20Quarterly%20report,to%20keep%20the%20lights%20on

[3] Resource and Energy Quarterly, March 2022, https://www.industry.gov.au/publications/resources-and-energy-quarterly-march-2022

Fig. 2.2 Australia: LNG Netback Price & Thermal Coal Price – History & Forecast



Wholesale Electricity Spot Market Prices

The wholesale electricity price forecasts take into account the marginal cost of producing electricity. As a result, the forecast profile is largely driven by the fuel price profile for thermal coal and gas.

To develop the wholesale price forecasts, we have analysed historical market setting behaviour by fuel type. In New South Wales, Black Coal has historically set the price most frequently, followed by Hydro, as shown below.

Over the outlook, we expect the frequency with which black coal sets prices to fall over time as coal generators shut down and other renewable sources ramp up. This is also consistent with the key assumptions made by MJA in their report. In the case of New South Wales, we expect that this source of renewable energy will be mostly hydro.

In particular, BISOE have adjusted the outlook to account for:

- Closure of Liddell Coal Generator – all units are assumed to be decommissioned in 2023-24, per the Australian Energy Market Operator (AEMO) assumptions[4].
- Closure of Erraring Coal Generator – all units are assumed to be decommissioned in 2025-26, per AEMO's assumptions.
- Snowy Hydro 2.0 coming online – assumed to be in 2025-26, as per AEMO's assumptions.

[4] AEMO Inputs, Assumptions and Scenarios Report (IASR) https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios

Fig. 2.3 New South Wales: Market Price Setting Frequency by Major Fuel Type

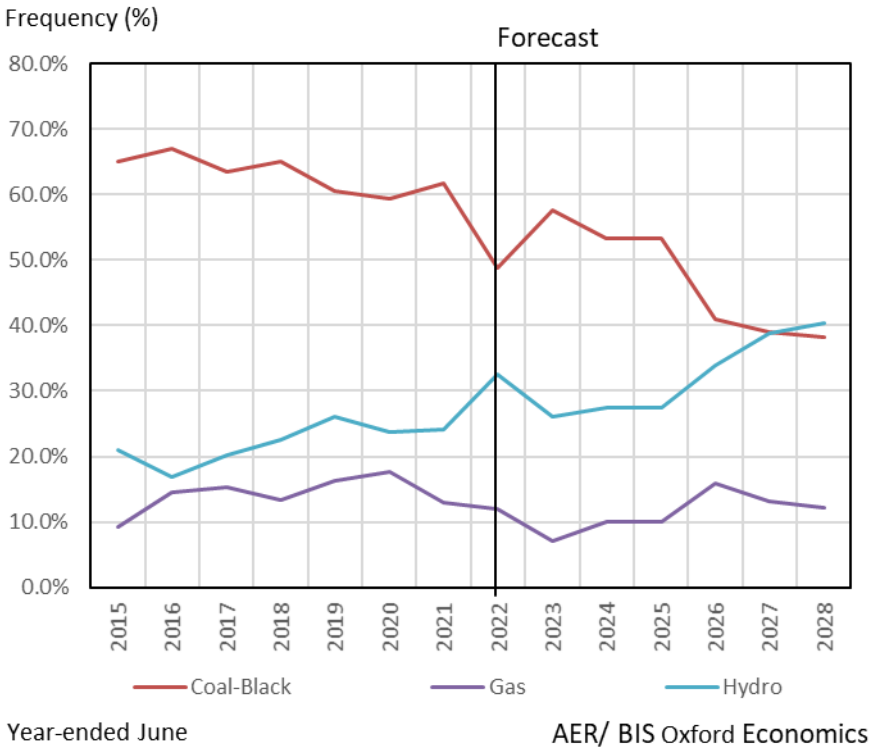
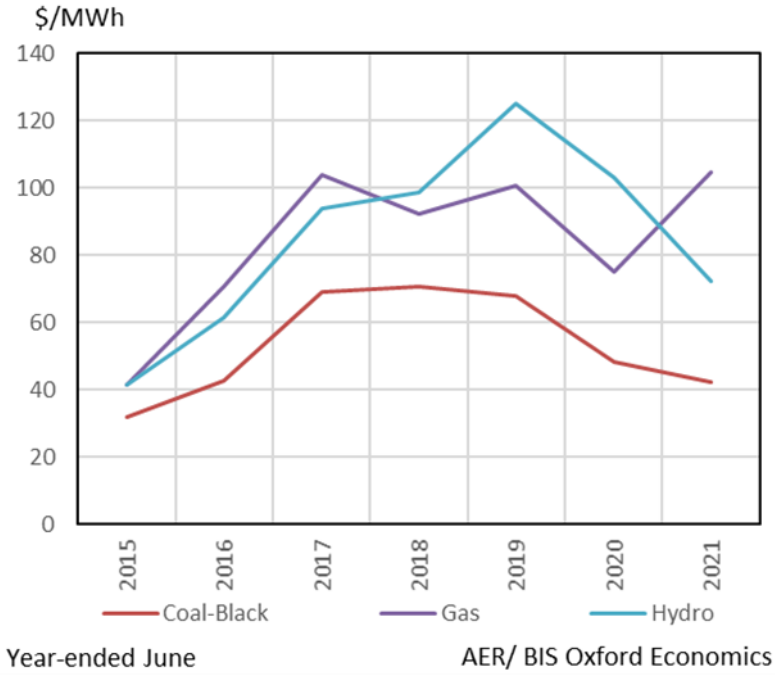


Fig. 2.4 New South Wales: Average Price Set by Fuel Type



Translating this to prices, we take a market price setting frequency – a weighted fuel cost approach to deriving the wholesale forecasts. Regarding the chart above, the other fuel types not included are brown coal, solar and wind – which accounted for an average of 2.6%, 2.7% and 1.3% respectively

over the past three years to 2021/22. Note that Hydro tends to adopt shadow pricing rather than pricing at own short run marginal cost, estimated at $7/MWh by AEMO[5]. Hydro tends to price to the next highest bidder, which has typically been gas, as shown in figure 2.4.

For this reason, in the case of Hydro we assume its price setting behaviour follows gas over the outlook. Therefore, despite an increase in renewable penetration (through Hydro) we do not expect this to significantly weigh on wholesale electricity prices. This is in contrast to MJA, who assume that increased renewable penetration begins to weigh on prices from 2025-26. BISOE believe our assumptions are consistent with historical behaviour.

Over the outlook period the spot market wholesale price is forecast to rise next year, as the global energy market price pressures continue to flow through. We expect wholesale electricity spot market prices to peak at 2023-24 before steadily correcting for the remainder of the forecast.

Risk to the Wholesale Electricity Price Outlook

It is worth noting that there are several factors of upside risk to the wholesale electricity price outlook. Some of these are transitory factors – the uncertainty of the Russia-Ukraine war and winter heating demand in Europe – while others could be more structural risks.

We assume in the baseline that renewable sources (hydro, solar, wind) come online to displace fossil fuel generation (black coal and gas). However, signficant transmission capacity is required to enable this to happen. There remains uncertainty around how fast the new high voltage transmission lines can be developed to enable increased renewable energy sources. Delays, in particular to construction, in the current supply constrained environment, is a pertinent risk.

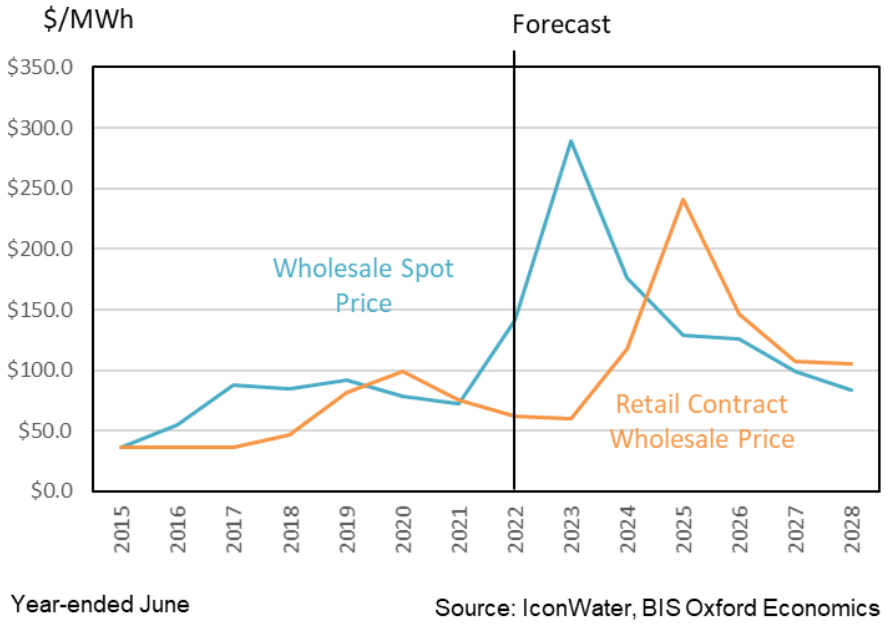
Meanwhile, the exit of already aging coal fleet is assured. Therefore, the implication from any delays to renewable generation coming online would be greater reliance on gas powered generation. This could result in higher wholesale electriricty prices if the current tighteness in global gas markets do not abate any time soon.

There is also an elevated risk from additional outages at the ageing coal-fired plants, due to minimum expenditure on maintenance as the plants approach their retirement dates. These outages would also require greater relaince on gas genearation.

The wholesale spot market price is assumed to be come through into the wholesale component of Icon Water's retail contract pricing with a lag, only peaking in 2025-26 before starting to correct. This is consistent with the historical experience (see figure 2.5), where there appears to be around a two-year lag between the spot wholesale price and the contracted wholesale price, due to the length of forward contacts.

[5] See AEMO Inputs, Assumptions and Scenarios Report (IASR) https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios

Fig. 2.5 Wholesale Electricity Spot Price Forecast vs. Icon Water Retail Contract (Wholesale Price component)



Network price growth profile

We used current AER determinations for Evoenergy in the Australian Capital Territory (ACT) to track the likely path of electricity transmission and distribution prices for the current pricing period (up to 2023/24). Beyond this, we have used the latest Draft Plan, prepared by Evoenergy for the regulatory period of 2024/25 – 2027/28[6].

Table 2.1 Distribution and Transmission X-Factors, CPI, 2024-25 to 2027-28

	2024-25	2025-26	2026-27	2027-28
Distribution X-Factor	-4.6%	-2.4%	-2.4%	-2.4%
Transmission X-Factor	0.3%	0.0%	0.0%	0.0%
CPI	3.0%	2.5%	2.5%	2.5%
CPI - X	7.3%	4.8%	4.8%	4.9%

Additionally, the ACT Government Feed in Tariff[7] (FiT) costs increased considerably in the 2022-23 financial year for all consumers of electricity. FiT costs here refer to the small/medium and large Feed in Tariffs. For the short term (up to 2022/23), FiT costs were taken from the AEMC's Residential Electricity Price Trends report[8]. This report states the forecast growth in costs were provided directly

[6] https://www.evoenergy.com.au/about-us/about-our-network/electricity-five-year-plan#:~:text=Consultation%20on%20Evoenergy's%20Draft%20EN24,Energy%20Regulator%20in%20January%202023.&text=Our%20current%20five%20year%20plan,the%20Australian%20Energy%20Regulator%20website.

[7] The ACT Feed in Tariff considered within the network cost component are those associated with the ACT legislation: *Electricity Feed-in (Large-scale Renewable Energy Generation) Act 2011*

[8] The AEMC Residential Electricity Price Trends: https://www.aemc.gov.au/market-reviews-advice/residential-electricity-price-trends-2021

from the ACT government. Beyond this period, we have assumed the FiT costs will increase in line with consumer price inflation.

Costs of green schemes

The green scheme costs consist of the national schemes, including:

- Large-scale renewable energy target (LRET),
- Small-scale Renewable Energy Scheme (SRES), and
- ACT's Energy Efficiency Improvement Scheme (EEIS).

Our LRET and SRES forecasts are based on current and forward trading prices of certificates (LGC and STC, respectively)[9]. Electricity consumers pay a percentage of the certificate price per MWh of electricity consumed. These percentages are provided by the Clean Energy Regulator. We have assumed the present year percentages for the duration of the forecast.

The current cost for the EEIS was provided to us by Icon Water. We have assumed this cost will increase in line with consumer price inflation.

Other costs

Other costs consist of metering costs, NEM fees and other ACT scheme costs. They contribute a small proportion of the total electricity price. Current costs were provided by Icon Water or sourced from the ICRC. We have assumed these costs will increase in line with consumer price inflation.

Table 2.2 Electricity Price Forecasts
(per cent change, year average, year-ended June)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Average (c)
	Actuals						Forecast	Next Revenue Determination Period					
NOMINAL ELECTRICITY PRICE CHANGES FOR INDUSTRIAL USERS													
Australian Capital Territory - Large Industrial Users	17.0	28.4	7.8	-12.8	-0.8	9.2	-1.1	35.4	56.4	-25.0	-12.7	1.1	11.0
Consumer Price Index - Headline (a)	1.7	1.9	1.6	1.3	1.6	4.4	7.1	4.8	3.0	2.5	2.5	2.5	3.1
REAL ELECTRICITY PRICE CHANGES FOR INDUSTRIAL USERS (b)													
Australian Capital Territory - Large Industrial Users	15.3	26.5	6.2	-14.2	-2.4	4.7	-8.2	30.6	53.3	-27.5	-15.2	-1.4	8.0

Source: BIS Oxford Economics, Icon Water

(a) Inflation forecasts are RBA forecasts to December 2024 from latest 'Statement of Monetary Policy'. Beyond that, inflation forecasts are based on the mid-point of RBA inflation target (2.5%).

(b) Real price changes are calculated by deducting the inflation rate from nominal price changes.

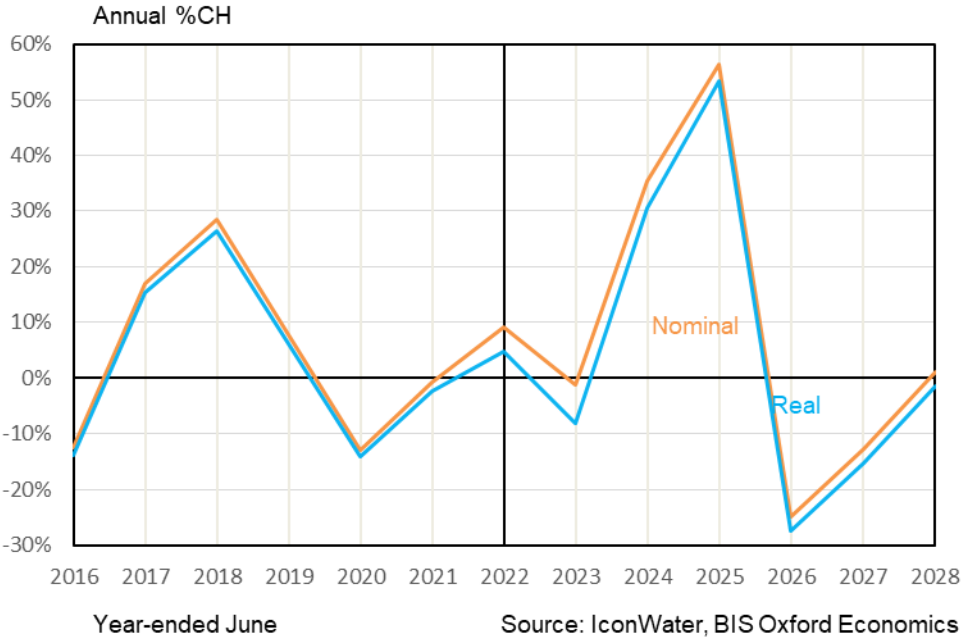
(c) Average for the next revenue determination period i.e. from 2023/24 to 2027/28 inclusive.

Final Retail Price Forecasts

The final retail price forecast takes into account existing retailer contracts for 2023-24, which is expected to fall by 1.1% from 2022-23 prices. Beyond this, we expect the current wholesale market price rises to come through, peaking in 2025-26 before correcting through 2026-27.

[9] Publicly traded certificate prices reported by Mercari: https://www.mercari.com.au/environmental/

Fig. 2.6 Industrial User Electricity Price Forecasts



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